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ABSTRACT

Injured workers are individuals whose injuries have resulted in residual impairment, making it impossible for them to return to their former jobs or to seek work in an allied field. This study investigated the differential effects of computer assisted career guidance (CACG) systems combined with a cognitive information processing strategy on injured workers' vocational behaviors. A sample of 83 participants was obtained from the population of industrially injured workers. These participants were identified as either physically unable to return to their original employers or unable to return to the type of job that they performed before their injury. Participants were assigned to four treatment groups: (1) information system, Ohio Career Information System (OCIS) with Process Instruction; (2) OCIS with Content Instruction; (3) guidance system, DISCOVER, with Process Instruction; and (4) DISCOVER, with Content Instruction. Each participant was pretested with the Career Decision Scale (CDS), and posttested with CDS, My Vocational Situation, Occupational Alternatives Questionnaire, and Career Counseling Evaluation Form. The results of the study suggested that the use of a career information system did not differ from a career guidance system on the dependent measures, and the cognitive information processing intervention had no differential effects on the treatment groups. However, counselor effect as well as the participants' gender, education, and pre-treatment vocational concern were found to have significant impact on the treatment outcomes. (Contains 42 references.) (ABL)

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The Use of Computer Assisted Career Guidance with Injured Workers

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

This study investigated the differential effects of computer assisted career guidance (CACG) systems combined with a cognitive information processing strategy on injured workers' vocational behaviors.

Injured workers are individuals whose injuries have resulted in residual impairment, making it impossible for them to return to their former jobs or to seek work in an allied field. Over the past two decades, many theorists have examined the career development needs of individuals with disabling conditions and provided conceptual frameworks for gathering information and delivering career counseling (Campbell and Hufferman, 1983; Curnow, 1989; Jaques and Kauppi, 1983; Lofquist, 1957; Osipow, 1986; Vandergoot & Wortall, 1979; & Wright, 1969). The provision of career counseling to this population represents a challenging task when focus is placed on the career behavior and the identification of methods for assisting them with specific career planning needs. This study investigated the differential effects of computer assisted career guidance (CACG) systems combined with a cognitive information processing strategy on injured workers' vocational behaviors.

A review of the literature supports the fact that the computer's distinctive capabilities have been implemented in career counseling and guidance (Katz, 1984; Sampson, 1983; Wagman, 1980). CACG systems can be divided into two categories, career information systems and career guidance systems (Harris-Bowlsbey, 1986; Marin, 1984; Myers, 1983; Sampson, 1984). In general, career information systems concentrate on helping the user locate and retrieve information about occupational options such as the employment outlook, job descriptions, and salary ranges. On the other end of the spectrum, career guidance systems are considered to be more comprehensive as they consist of subsystems such as self assessment, teaching of decision-making, occupational information, job seeking skills, and action planning. Nevertheless, a trend in system development suggests increasing the mixture of these two groups both in the present and the future (Harris-Bowlsbey, 1989).

Many agree that CACG systems reached maturity in the 1980's, however, many issues related to CACG research and implementation are waiting to be solved (Harris-Bowlsbey, 1989; Katz, 1989). Recommendations are made with respect to efficacy of CACG with special populations, need for models for innovative implementation of CACG systems, adequacy of counselor pre- and in-service training, and appropriate research/evaluation methodology (Sampson & Reardon, 1989). According to Shahnasarian (1985), CACG research and evaluation studies have elicited similar criticisms extended from shortcomings of career counseling outcome research such as those proposed by Fretz (1981), Oliver(1979), Osipow

(1982), and Spokane & Oliver (1983). Specific concerns of CACG research also addressed a need to go beyond the viability of CACG systems and to move to determining how this resource may best be utilized by individuals varying in characteristics and needs.

Recently, Osipow (1987) notes that cognitive variables have begun to take an important position in understanding career development and career counseling. Stone (1983) offered some conceptual challenges for cognitive-behavioral theorists interested in career issues. One of his questions seems to be fundamental: How do we incorporate the processing of information into career counseling as we relate cognitive career applications for career problems? Shahnasarian (1985) graphically presented the interrelationships among information gathered about self and the world of work, individual cognitive processing, and the method of principal elements contributing to an individual's career decision-making (Figure 1).

Place Figure 1
about here

The information processing model of learning theory (Gagne, 1985) lends itself to the use of computers in the counseling process. Learning, as defined by Gagne, is a set of internal individual processes which transform stimulation from the individual's environment into a number of forms of information resulting in the establishment of long-term memory states; such states (learning outcomes) provide the individual with capabilities for various human performances. When the use of the computer seems viable in providing the user with self and occupational information, Gagne's concepts of learning outcomes and their corresponding internal and external learning conditions present a comprehensive set of instructional implications for establishing a cognitive strategy in career decision-making. Shahnasarian (1985) proposes that assisting CACG system users in the acquisition and development of decision-making cognitive strategy prior to their interaction with the system could be a viable method for enhancing the CACG outcomes.

The purpose of this study, therefore, was to examine the combined effect of a computer-assisted career guidance system (DISCOVER, American College Testing, 1987), a computer-assisted career information system (Ohio Career Information System, OCIS), and a cognitive information processing intervention on injured workers' career decision-making behaviors. The dependent variables were career indecision,

vocational identity, and occupational certainty as well as clients' program evaluation. Two attribute variables, sex and education level, were built into the study in order to help explain the possible confounding factors.

Method

Participants

A sample of 83 participants (Krejvie and Morgan, 1970) was obtained from the population of industrially injured workers, who were referred to the career counseling program in a public rehabilitation center over a four-month period of time. These participants were identified as either physically unable to return to their original employers or unable to return to the type of job they performed before their injury. The demographic data indicated a gender composition of 60 percent male and 40 percent female. The mean time off work since the injury was three years. Participants with self-reported back injury composed more than three-fourths (76%) of the sample. Approximately two-thirds (65%) of the subjects had either a GED, a high school degree, or post-high school education. The majority reported no prior career counseling (92%) nor CACG (93%) experiences.

Procedures

The setting for this study was the career counseling program in a rehabilitation center in a large midwestern city. Participants w_ e randomly assigned to four treatment groups: (a) Group 1 : information system (OCIS) with Process instruction, (b) Group 2 : OCIS with Content Instruction, (c) Group 3 : guidance system (DISCOVER) with Process Instruction, and (d) Group 4 : DISCOVER with Content Instruction. This intervention, entitled "Content Instruction", was an activity developed by the authors intended to facilitate the learning of cognitive strategies in relation to career decision-making. The instructional events noted by Gagne (1985) were employed in this activity: establishing expectancy, directing attention, providing guidance for encoding, and enhancing retention and transfer. The Process instruction was a counterpart to content instruction which was a brief orientation given to the participants .

Data were collected from the participants by two career counselors who were employed full-time. Each counselor worked with all groups to control for external validity threats. Each participant was pretested with the Career Decision Scale (CDS) and posttested with CDS, My Vocational Situation (MVS), Occupational

Alternatives Questionnaire (OAQ) and Career Counseling Evaluation Form (CCEF). A counselor training session (CACG inservice and counseling protocol for each treatment condition) was conducted by one of the researchers to minimize the variations among groups.

Measures

Career Decision Scale (CDS). Career indecision (pretest and posttest) was measured by the CDS (Osipow, Carney, Winer, Yanico, & Koschier, 1976). It is a 19 item instrument designed to promote self-understanding about career indecision and to measure the degree of indecision regarding career choice which a person is experiencing. The CDS is comprised of the Certainty Scale and the Indecision Scale. Only the Indecision Scale was employed in the present study. The Indecision Scale consists of 16 Likert-type items which are briefly stated reasons most often reported by people as the explanation for their career indecision.

The scale is reliable (test-retest correlation between .80 and .90) and appears to have construct validity (Osipow, Carney, & Barak, 1976). In a review of the development and research conducted with the CDS, it can be concluded that the CDS has been used extensively in past research as a criterion measure to investigate the effectiveness of career guidance intervention methods (Marin, 1984; Garis & Niles, 1989).

My Vocational Situation (MVS). Vocational identity was evaluated by the MVS (Holland, Daiger, and Power, 1980a). The MVS is designed to assess the problems which may be troubling an individual seeking help with career decisions. It consists of three scales: the Vocational Identity Scale, the Occupational Scale, and the Barriers Scale. Only the Vocational Identity Scale was utilized in this study. It consists of 18 personal statements which the respondent is instructed to indicate as either true or false.

Holland, et al. (1980b) presented scale reliabilities for college students and workers for the Vocational Identity Scale: male, KR 20 = .89 (n = 291); female, KR 20 = .88 (n = 301). In their discussion of the construct validity of the Vocational Identity Scale, Holland, et al concluded that high vocational identity scores tend to be negatively associated with expressed need for help in diverse areas of concern.

Occupational Alternatives Questionnaire (OAQ). Occupational certainty was measured by the OAQ which was developed by Zener and Schnuelle (1972) and revised by Slaney (1978; 1980). It is a self-administered instrument consisting of two questions which require written responses. Marin (1984) reviewed the research into the OAQ's demonstrated reliability and validity as a criterion measure for occupational certainty.

Reymond (1972) reported a .93 test-retest reliability of a questionnaire that included the OAQ. In addition, Slaney, Stafford, and Russel (1978) acertained that the OAQ demonstrated concurrent validity with other measures of career indecision, including the CDS.

Career Counseling Evaluation Form (CCEF). The CCEF is an 11-item instrument with a 5-point Likert scale. It was designed by the career counseling program director and revised by the researchers to collect information about both the clients' evaluations of their perceived program effectiveness.

Results

This study employed the Pretest-Posttest control group design categorized by Campbell and Stanely (1963). The null hypotheses were tested by analysis of variance (ANOVA) as well as Pearson-Product Moment Correlation. The null hypotheses were rejected if the results were significant at the .05 level.

Effects of CACG systems

Table 1 provides a summary of findings for the question " Does the use of a career information system differ from a guidance approach in enhancing injured workers' career decision making behaviors?" The differences of mean scores between G1 and G3 and between G2 and G4 revealed inconsistent results of information and guidance approaches. Based on the one-way ANOVA analysis, it can be concluded that information system (OCIS) and guidance system (DISCOVER) did not significantly differ in their effects on the dependent measures.

Place Table 1
about here

Effects of the Cognitive Information Processing Intervention

Table 1 also provides findings pertaining to this question: " Can the utilization of CACG systems for injured workers be enhanced by the intervention of cognitive information processing?" It can be concluded that the utilization of a cognitive information processing intervention did not significantly enhance the results of both CACG systems. However, comparisons of group means between G1 and G2 as well as between G3 and G4 suggested that when used with an information system the intervention tended to result in more positive effects on the dependent measures than when employed with a guidance system.

Vocational Concerns Mediating Treatment Effects

Table 2 contains findings in relation to the question " Do client vocational problem concerns such as career indecision mediate the treatment effects on injured workers' career decision making behaviors?" The findings of Pearson-Product Moment Correlation indicated that there were significant relationships between the subjects' pretest score of CDS and posttest scores of career indecision ($r = .74$, $p < .05$), occupational certainty ($r = -.23$, $p < .05$), and vocational identity ($r = -.19$, $p = .05$). It can be concluded that the subjects' vocational concern (i.e. career indecision) had an impact on the treatment outcomes.

Place Table 2
about here

Effects of Personal Attributes

Table 3 provides a summary for the results of the question " Do client attributes such as sex and education level mediate the treatment effects on injured workers' career decision making behaviors?" The two-way ANOVA's by subjects' sex, education, and treatment group suggest that female subjects scored significantly higher on the posttest of career indecision than male subjects ($F = 5.01$, $df = 1$, $p = .03$). No other significant evidence was found regarding the main effect or interaction of sex, education and treatment groups on the dependent variables.

Place Table 3
about here

Counselor Effect

Although predictions were not made, additional analyses were performed to explore counselor effect as a possible confounding variable. Based on the one-way ANOVA on the dependent measures and subjects' evaluation of the Career Counseling Program (CCEF scales). The following findings were suggested, the participants of Counselor A scored significantly lower on post-CDS ($F = 5.15$, $df = 1$, $p < .05$) and higher on their evaluation regarding obtaining specific career information ($F = 4.99$, $df = 1$, $p < .05$) than the participants of Counselor B. Observed differences, although not statistically significant, also indicated that the participants of Counselor A tended to score higher on most of the scales of the CCEF.

Discussion

The present study attempted to build upon prior investigations by examining the relationship between career counseling methods and the resultant injured workers' vocational behaviors. The results suggest that the use of a career information system did not differ from a career guidance system on the dependent measures, and the cognitive information processing intervention had no differential effects on the treatment groups. However, counselor effect as well as the participants' gender, education, and pre-treatment vocational concern were found to have significant impact on the treatment outcomes.

The results regarding the differential use of CACG systems and a cognitive information processing strategy did not yield statistical significance. These are in supports of previous indeterminate CACG studies with speculation of the absence of an enriched context for the CACG systems to promote effective vocational behaviors (Cario, 1983; Garis, 1982; Shahnasarian, 1985). Whereas the paradigm of public-funded rehabilitation programs with major emphasis on job placement may be embedded (Vandergoot & Wortall, 1979), the conceptualization of the relationship between people and work remains questionable, and the goal of career counseling for injured workers inappropriately defined. The use of CACG systems in such a context may seem invalid, if not more confusing. The distinction between the guidance systems and the information system may be minimized if used only for the purpose of retrieving occupational information. This is equally true of investigating effects of an innovative cognitive strategy.

An examination of the assumptions which form the basis of CACG systems suggests that occupational information is a necessary prerequisite to career decision-making and that career decision-making is a rational and cognitive process. However, it was found in this study that career indecision, sex, and education accounted for the variance of treatment effects. While the dynamics of cognitive learning process is well recognized and implemented in CACG systems which facilitate client career development, the question of whether a computer contribute to the client's affective domain of career choice remains to be determined.

As indicated in the results of this study, the computer intervention did not seem so powerful as to transcend the counseling strategy of a particular counselor. The use of computer information delivery may not prove effective to all counselors considering individual differences in training level, counseling beliefs

and styles. Counselor effect, clients, and counseling environments were regarded by Oliver (1979) as difficulties of field experiment research. In the present study, when a greater number of counselors were not typically available in a field experiment setting, efforts providing for standardization of counselor interpretation of experiment procedures to manipulate the breadth and scope of counselor intervention would have likely yielded more control over counselor effect.

As many have cautioned, certain precautions traditionally associated with conducting research in a field setting must be acknowledged when attempting to interpret and generalize the findings of this study (Oliver, 1979). The following recommendations are based on the findings of this study.

(1) The efficacy of the utilization of CACG systems with injured workers should be viewed within the context of vocational rehabilitation for industrially injured workers. It is recommended that congruence be achieved between career counseling program priorities and CACG system objectives for future program development and evaluation in facilitating injured worker's career decision-making.

(2) Framework, such as that of Nagi (1969) or Wright (1981), providing an early diagnosis of injured worker's physical, psychological, social-cultural, and work adjustment functioning seems crucial before career development can be appropriately facilitated and measured.

(3) Research is clearly needed to provide an understanding of those aspects of career development that may be assisted by computer technology. While the modern theoretical view of learning as a set of information processes has potential application to the facilitation of individual career development, a conceptual framework is needed in the matching of technological prescriptions with characteristics of the career decision-maker.

(4) While the impact of computer technology on the counseling profession is growing continuously, the counseling task and hypothetical assumptions concerning counselor responsibility need to be redefined so that objective measurement can be acertained. Counselor training and opportunities for professional development should be pursued to broaden counselor interests, skills and programmatic goals in order to help counselors fully understand the strengths and limitations of incorporating technology into their professional practice. The accountability model in which counselors are challenged to have a knowledge of

cognitive learning conditions (Gagne, 1985) for CACG implementation seems a viable example (Peterson & Burck, 1989).

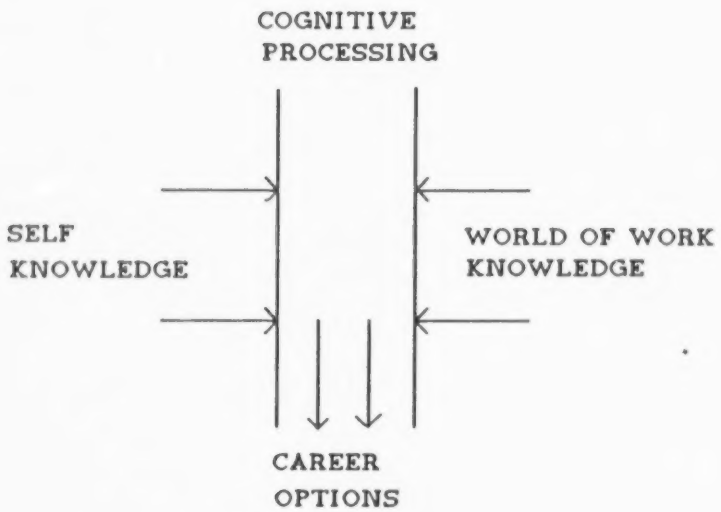

Figure 1. Cognitive Process and Career Decision-Making

From "Use of A Computer Assisted Guidance System with Prior Schematic Cognitive Structuring" by Michael Shahnasarian, 1985, p. 5. Unpublished doctoral dissertation, The Florida State University, Copyright 1985 by Michael Shahnasarian. Adapted by permission.

Table 1
Summary of One-Way ANOVA by Group

Variables	Mean G1	G2	G3	G4	F	p
Indecision-Pre-CDS	36.40	36.55	37.11	40.29	.68	.57
Indecision-Post-CDS	30.80	30.37	31.65	38.88	2.65	.06
Identity-MVS	11.08	12.26	15.88	8.27	2.44	.07
Certainty-OAQ	3.16	3.37	3.25	3.00	.37	.77

Table 2
Summary of Pearson-Product Moment Correlation Coefficient

Variables	n	Pearson-Product Moment Correlation Coefficient (r)	p
Indecision-Post-CDS	75	.74	.0001*
Certainty-OAQ	74	-.23	.02*
Identity-MVS	74	-.19	.048*

* $p < 05$

Table 3
Summary of Two-Way ANOVA by Sex, Education, and Group

	Pre-CDS		Post-CDS		MYS		QAQ	
	F	p	F	p	F	p	F	p
Main Effect								
Group	1.09	.36	2.74	.09	2.41	.07	.39	.76
Sex	.65	.42	5.01	.03*	.05	.83	3.38	.07
Interaction	.38	.77	.11	.95	.97	.41	.25	.86
Main Effect								
Group	.16	.33	1.92	.13	.24	.63	.59	.62
Education	2.00	.16	.51	.48	.03	.87	.51	.48
Interaction	.36	.78	.09	.97	1.49	.23	.46	.71

* $p < .05$

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